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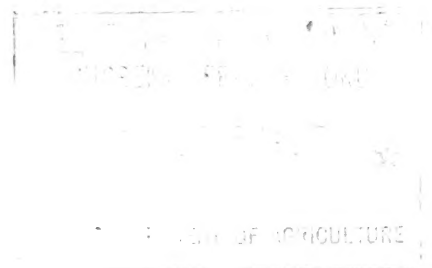


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# Cooperative

# Forest and Range Management Research in South Florida

by O. Gordon Langdon and Robert S. Rummell



SOUTHEASTERN FOREST EXPERIMENT STATION  
Asheville, North Carolina



U. S. Department of Agriculture - Forest Service

To find ways for making best use of the land for tree and grass production, the U. S. Forest Service, through its Southeastern Forest Experiment Station, has under way a cooperative program of research in forest and native range management. Headquarters for this south Florida project is at Fort Myers. The program is young. Forest management research was started in 1951; range management research began in late 1953. Public agencies cooperating with the Forest Service are the Florida Agricultural Experiment Station and the Florida Board of Forestry. Private cooperators include the Atlantic Land and Improvement Company, and the Collier Enterprise.

COVER PHOTO: South Florida is characterized by highly diversified land use. Fifteen million acres of cut-over forest land, prairies, and swamp land and 3 million acres of improved pasture provide grazing for nearly a million beef cattle yearlong. Vegetable production (center) utilizes nearly three-fourths of a million acres annually. Highways and homesites occupy half a million acres.

COOPERATIVE FOREST AND RANGE  
MANAGEMENT RESEARCH IN SOUTH FLORIDA

by

O. Gordon Langdon and Robert S. Rummell  
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INTRODUCTION

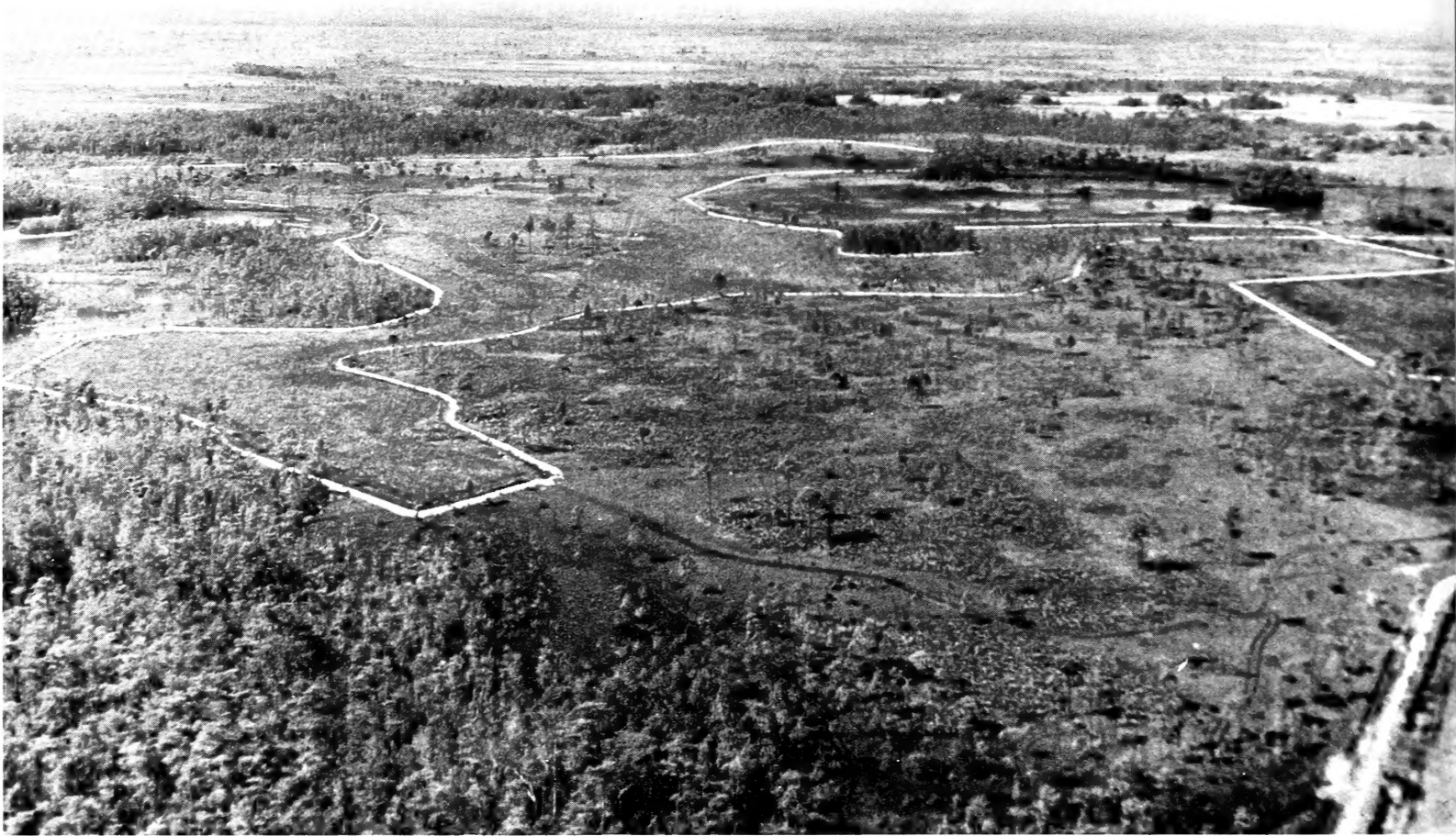
The Spaniards depended upon native grass to feed their cattle when they arrived in Florida in the early 1500's. Through the years use of grass for livestock forage and trees for lumber and other wood products has continued. South Florida's original forests now have been heavily logged; large numbers of beef cattle continue to graze native rangelands.

With increasing population and an increasing demand for wood and beef, Florida's native forests and rangelands must be managed for high, sustained productivity. This goal can be achieved by application of sound management systems developed through research.

The south Florida project area encompasses 17 million acres, or roughly one-half the total land acreage of Florida, extending from the vicinity of Orlando and Sanford south through the Everglades. This area of 30 counties has tremendous possibilities for agricultural development, provided the land is wisely used.

Major problems in forest and native rangeland management facing landowners in south Florida are presented in this progress report along with brief discussions of results of current studies.

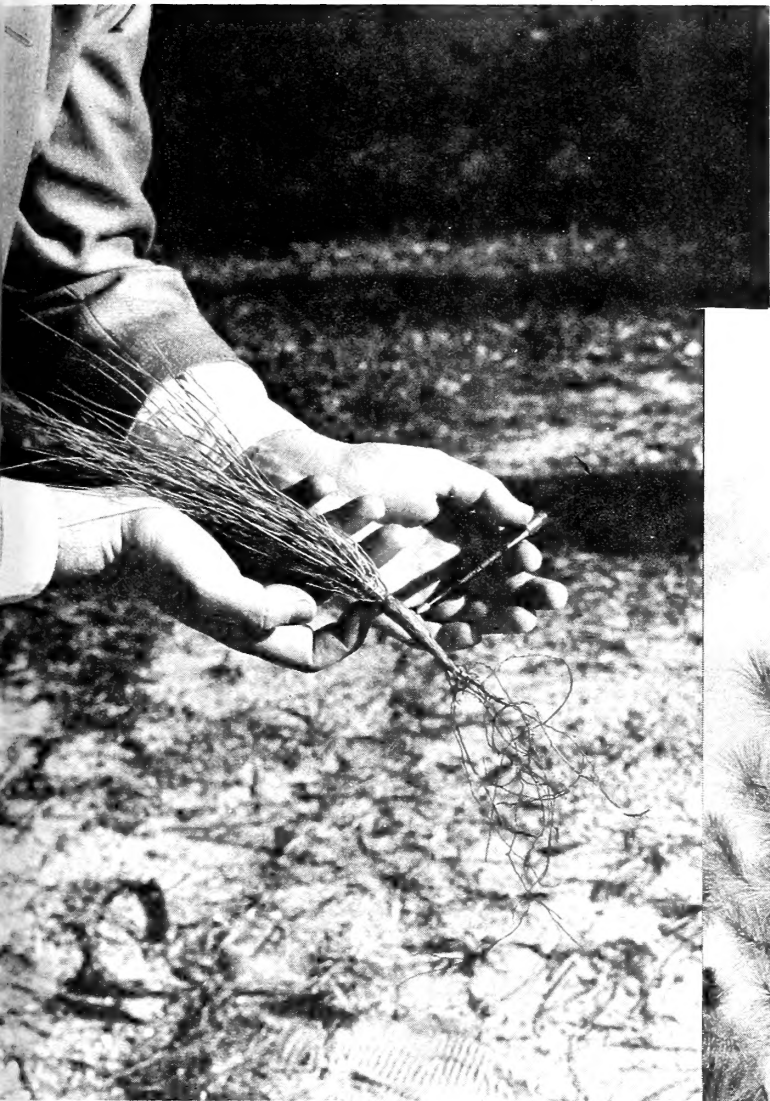
## SOUTH FLORIDA IS UNLIKE OTHER REGIONS IN THE UNITED STATES



Farms are carved out of native range and forest land.

It is a flat to gently rolling country of sandy soils, abundant ponds and marshes. The climate is subtropical with moderate year-round temperatures, high rainfall in summer and low in winter. Timber, beef cattle, citrus fruit, and winter vegetables are important agricultural crops. In parts of south Florida, vegetables are raised under a seminomadic system, known in some tropical foreign countries as "shifting agriculture." One or two crops are raised, the land is abandoned, and the farmer moves on to new land.





Carrot-like roots of the seedling and growth of the sapling are the most characteristic features of South Florida slash pine.

One of the principal trees is found only in the Florida peninsula. This tree, the South Florida slash pine (Pinus elliottii var. densa), was recognized as a distinct variety of slash pine in 1952.



◀ Lopside Indiangrass is one of the prominent grasses beneath open forest stands in the wiregrass type.



▶ Marshy ranges provide winter grazing for some of the one million beef cattle in south Florida.

Over 1,000 different kinds of range plants grow on a wide variety of sites from forested pinelands and wet marshes to naturally treeless prairies.



## MOST OF SOUTH FLORIDA'S PINE FORESTS HAVE BEEN LOGGED

Today only scattered trees grow on vast areas of once productive commercial forest land. →



← Many cutover forest ranges are heavily grazed.

South Florida has 8 million acres of commercial forest land, of which nearly 75 percent is denuded or poorly stocked with trees. Most of this forest land is grazed by beef cattle.

A BASIC QUESTION IS HOW TO MAKE BEST USE OF THE FOREST-RANGELAND.  
SHOULD TREES OR GRASS BE THE PRINCIPAL PRODUCT?  
OR, CAN TREES AND GRASS BE PRODUCED TOGETHER?



Cattle graze wiregrass in open pine forests .

Research must provide the facts so that an individual landowner can decide which alternative is most profitable and best fits his soils, land use, and personal preference patterns.

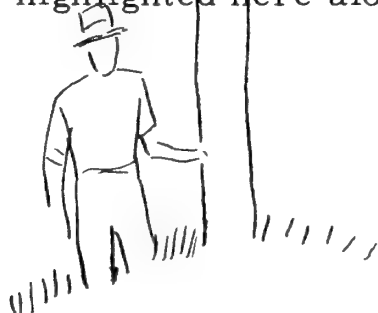
To answer this fundamental question, separate research is needed in timber production and in range management, complemented by study of inter-related range and forestry problems.

The following material pinpoints the major problems and shows how scientists are endeavoring to solve them.



FOR GREATEST PRODUCTION, FOREST LANDS MUST BE PROPERLY MANAGED THROUGH CONTROL OF FIRES, TIMELY THINNINGS, AND HARVEST CUTS THAT PROVIDE FOR ADEQUATE STAND REPRODUCTION. IN ADDITION, EFFICIENT MEANS MUST BE SOUGHT FOR ARTIFICIALLY REFORESTING THE PRESENT DENUDED AND POORLY STOCKED STANDS. SIGNIFICANT PROGRESS HAS BEEN MADE, BUT GAPS EXIST IN OUR KNOWLEDGE OF PROPER FOREST MANAGEMENT IN SOUTH FLORIDA.

Some of these gaps are highlighted here along with some significant findings.



CAN 3-3/4 MILLION ACRES OF THE CUTOVER FOREST LAND  
IN SOUTH FLORIDA BE RESTOCKED SUCCESSFULLY BY  
PLANTING OR SEEDING?



Typical cutover forest land in south Florida .

In past years, reforestation in south Florida by planting and direct seeding was generally not successful because of poor survival. With recent accelerated interest in tree planting, research was concentrated on this problem. Studies have centered first on determining why seedlings died and then in developing or improving techniques to increase survival.





Nursery studies have shown that survival of seedlings, as well as their size and color, can be manipulated by nursery fertilization. This is particularly evident during a droughty year, making the findings even more important.

Lifting nursery stock so as not to strip off secondary feeder rootlets is an important factor in increasing subsequent survival in field plantings.



Field survival has been found related to seed size. Screening seed into various sizes has proved an effective way of separating seedlings into grades that survive better in field plantings. These results point to a new method of grading.





Roots are pruned on experimental scale in seedbeds. Other special foliage and root treatments are also being tested. These are aimed at assuring early seedling establishment by stimulating root growth and reducing transpiration following planting. Root pruning appears to be a very promising method for stimulating root growth. Further tests are being made to follow up this lead and to develop practical techniques.



Soil moisture and groundwater levels are under study to determine their influence on seedling survival and growth. Soil moisture samples are taken periodically.



VARIOUS TECHNIQUES OF PLANTING AND TIME OF PLANTING  
HAVE BEEN TESTED FOR THEIR EFFECT ON SURVIVAL.

Hand planting. ➔

Techniques or methods of planting are of consequence only as they influence planting the tree correctly. The seedling must be set firmly in the soil at the right depth, with the top of the planting slit closed completely. The best time to plant in south Florida is late fall or early winter.



◀ Machine planting.

## WHAT TREE SPECIES SHOULD BE PLANTED IN SOUTH FLORIDA?



South Florida  
slash pine?

Common slash pine?  
Or other species?

Choice of species to plant must be based on ability to survive, to grow, and to resist insect and disease attack under prevailing soil and climatic conditions. For most large-scale plantings in south Florida, the pines native to a particular area will probably be the preferred species. However, useful and adapted exotic trees may be found by the Florida Forest Service through its tropical forestry research project.

Basic information on relative survival and growth is being obtained for the commercially important native pines--longleaf, loblolly, common slash, and South Florida slash.

A successful 4-year-old  
plantation in south Florida.



Results of this research, together with practical experience of progressive landowners, indicate that tree planting can be successful in south Florida if close attention is paid to all phases, from seeding and fertilizing the nursery beds to planting the seedling in the field.



HOW CAN THE 600,000 ACRES OF MATURE STANDS OF TIMBER  
IN SOUTH FLORIDA BE CUT TO ASSURE A NEW CROP OF TREES?



Mature stand of South Florida slash pine.

Many harvested stands have not reproduced adequately in the past. Often contributing to the lack of reproduction are wildfire, lack of sufficient seed, poor seedbed conditions, and other factors of more local occurrence. Research needs to find answers to such important questions as: When can controlled burning be used and under what conditions? How many seed trees should be left as an adequate seed source? What are the seedbed requirements for satisfactory germination and survival?





Seed traps are used to measure seed production, and seedlings are counted on milacre plots.

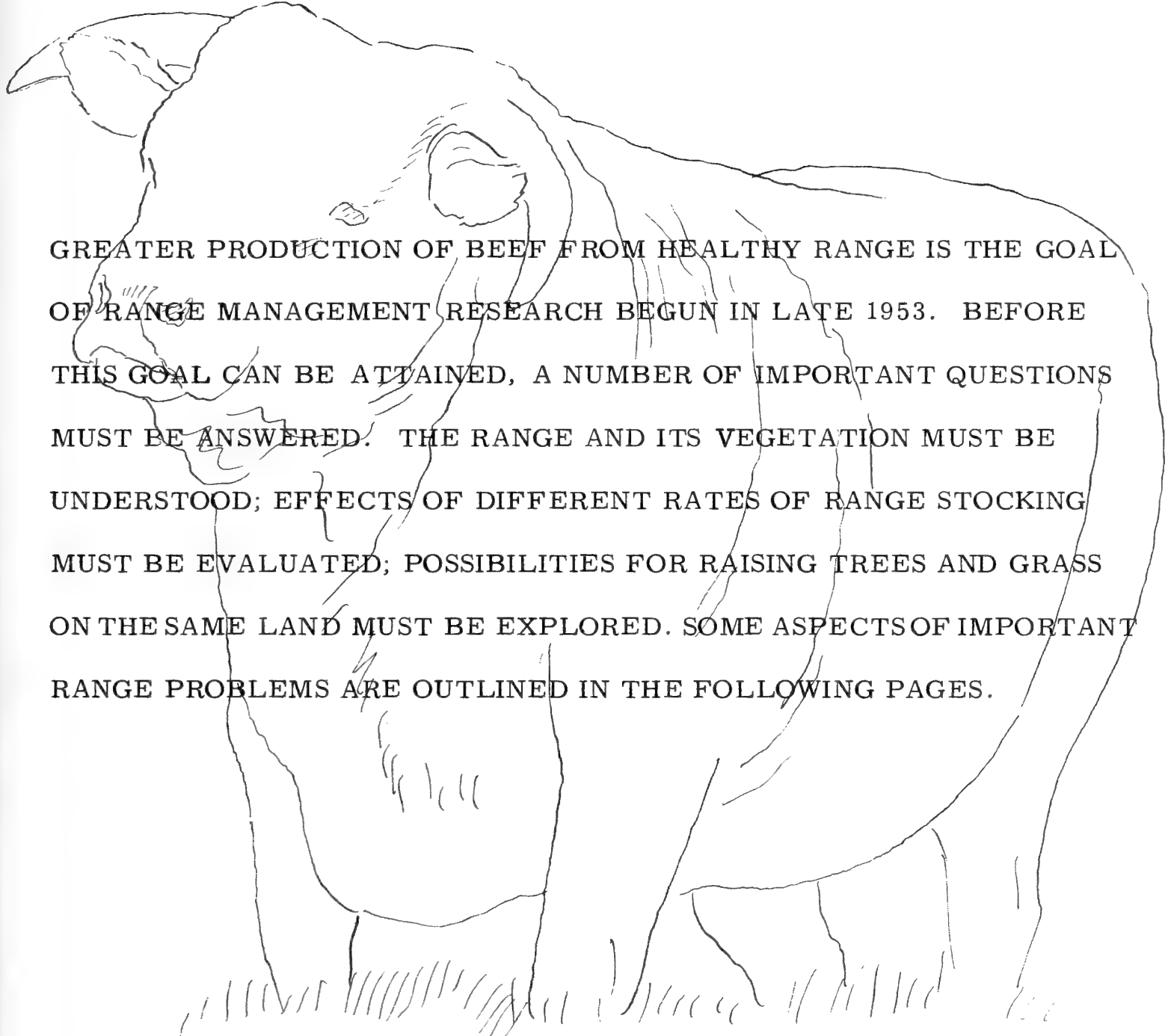
Seed production records for the first 2 years of a 5-year cooperative study show a wide variation from year to year in amount of seedfall. For example, only one seed fell in 1953 for every 100 which fell in 1952. The number of seedlings established corresponded to this seed production. About 90 percent of total seedfall occurs between October 1 and November 15. If future studies reveal that seedbed requirements are exacting, timing of the harvest cut with season and a good seed year may be necessary to obtain adequate reproduction.

WHAT YIELD CAN BE EXPECTED FROM FORESTS AT VARIOUS AGES, STAND DENSITIES, AND SITE CONDITIONS FOUND IN SOUTH FLORIDA?



About one hundred permanent plots will be established to obtain estimates of expected yields.

Making estimates of expected yields is of considerable interest to the forest landowner. For the pines growing in south Florida, little is known about expected yields, when and how heavily to thin for maximum production of pulpwood or sawlogs, or the combined effects of age, stand density, and site quality on yields. A study is being undertaken, in cooperation with many forest landowners, to find answers to these questions for the range of age, stand density, and site conditions encountered in the region.



GREATER PRODUCTION OF BEEF FROM HEALTHY RANGE IS THE GOAL OF RANGE MANAGEMENT RESEARCH BEGUN IN LATE 1953. BEFORE THIS GOAL CAN BE ATTAINED, A NUMBER OF IMPORTANT QUESTIONS MUST BE ANSWERED. THE RANGE AND ITS VEGETATION MUST BE UNDERSTOOD; EFFECTS OF DIFFERENT RATES OF RANGE STOCKING MUST BE EVALUATED; POSSIBILITIES FOR RAISING TREES AND GRASS ON THE SAME LAND MUST BE EXPLORED. SOME ASPECTS OF IMPORTANT RANGE PROBLEMS ARE OUTLINED IN THE FOLLOWING PAGES.

## WHAT ARE THE GRAZING CAPACITIES OF FLORIDA'S NATIVE RANGES?



Beef cattle of Brahman breeding graze native range.

Recent authoritative statements indicate that one of Florida's main range problems is overstocking. Information must be obtained through research on how many acres are needed per animal. How many pounds of herbage the range produces and to what degree the important plants can be safely grazed are important questions needing answer. Since season of use can influence range productivity and grazing capacity, studies need to be made covering different grazing periods.



## WHAT ARE THE IMPORTANT NATIVE RANGE PLANTS?

Many kinds of shrubs  
grow in south Florida. →



← In 1954, 354 kinds of  
plants were found on  
which cattle had grazed.  
One hundred forty-seven  
of these were grasses.

Specimens of forage plants have been collected, identified, and placed in an herbarium for reference. Further study is needed to sort out the most important range plants and to learn how they react to different degrees of grazing. Nutritive values of the plants must be determined for different seasons of the year.



## WHAT ARE THE LONG-TIME EFFECTS OF FIRE ON THE RANGE?



Grass on this burned wiregrass range was eaten to the ground by cattle during the winter.

Can the better forage plants continue to grow vigorously if burned off every year or so? Since range burning has been a common practice on Florida's rangelands for hundreds of years, the existing forage plants probably are the ones which can withstand fire. However, preliminary observations show that some of the plants which cattle prefer are less abundant where promiscuous burning has occurred. Perhaps the desired forage plants can be encouraged through an improved burning system. Study is needed to learn whether this is true.

## HOW PRODUCTIVE ARE FORESTED RANGES FOR GRAZING BEEF CATTLE?



Kinds and amounts of forage plants are determined on a forested range.

What relationships exist between forage quality and the quantity and density of trees? South Florida has thousands of grazed acres on which slash pines also are being grown for timber production. As the timber stand matures, what happens to the range vegetation and its nutritive value? How much forage and beef can be produced on ranges with different densities and volumes of trees? At what age and density of trees does grazing cease to pay on forested lands? Is grazing harmful to timber stands? Answers to these questions are important in determining how trees and grass can be produced together.

## CAN UNDESIRABLE PLANTS BE CONTROLLED THROUGH RANGE MANAGEMENT?



Saw palmetto crowds out good forage plants.

On thousands of acres of Florida's rangelands saw palmetto grows abundantly. While it provides some forage, especially when recently burned or on ranges used in conjunction with improved pasture, its forage value is not high. How can saw palmetto and other undesirable plants be controlled or eliminated? Will improved management do the job? What about fire? Ranchers have been burning saw palmetto ranges for many years with indifferent success. Will a planned burning program aid in removing saw palmetto?



## HOW CAN TREELESS PRAIRIE RANGES BE MANAGED TO CONTRIBUTE MORE SUBSTANTIALLY TO THE BEEF CATTLE INDUSTRY?

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South Florida has 1.5 million acres of naturally treeless rangelands.

Ways are needed for improving forage quality through manipulation of grazing seasons, burning practices or other management techniques on the treeless prairie ranges. Good management systems developed for forested or cutover rangelands may also prove useful on the treeless prairies.



Landowners like John Norman, Okeechobee County, can profit by answers to forest and native range problems. Scientists of the U. S. Forest Service and the State of Florida are working to provide the answers through a cooperative program of forest and range management research in south Florida.





